

chlorine flask, should be passed beneath the surface of the water; while from the other opening should come another tube, the free end of which should turn over into a glass globe of water. These preliminaries arranged, fresh chlorine should be driven in until the water within is saturated by it, the fact of saturation being determined by the passage of chlorine through the escape-tube. When the water around the body should thus become charged with chlorine, the openings in the lid of the shell should be closed, and the whole should be left undisturbed for twelve hours.

"5. On opening the lid after the interval of time named, common salt should be added to the water, until the hydrometer should stand several degrees above the specific gravity of the blood; the specific gravity of 1,100 would answer for the solution. In this solution the body should remain immersed for twelve hours; the water should then be drawn off and the body examined.

"[If there were no deep decomposition and discoloration, the body, I believe, would now be ready for identification; but if the putrefaction were very deep-seated, it would be requisite to proceed further.]

"6. If necessary, open the trunk of the body at this point, and make any post-mortem observations that may be required. The head should not be opened at this stage.

"7. After the post-mortem examination, in order to restore a more natural expression to the face, solutions should be injected into the external carotid of each side. The form of solutions I should suggest in another case would be—

"(a) Water saturated with chlorine, and charged, in addition, with tincture of the sesquichloride of iron in the proportion of two fluidrachms to the pint.

"(b) Common fresh milk saturated with common salt.

"Of injection *a*, I would recommend that from two to three ounces should be slowly injected on each side, to be followed, without removing the nozzle of the syringe from the vessel, by so much of solution *b* as should cause the slightest possible tension on the tissues of the face.

"Lastly, if it were requisite to retain the body for some time, it would be advisable to cover it with wood spirit, containing one drachm to the gallon of the tincture of sesquichloride of iron, and to exclude it from the air.

"In offering these suggestions, I beg that they may be accepted as open to revision; the principle recognized, the details are certain, under experiment, to be simplified and improved.

"In conclusion, I have to offer my warmest thanks to Dr. Edmunds for the energetic, friendly, and able part which he took in the very interesting inquiry to which I have called attention. His exertions contributed in a most important manner to the results obtained.

50. *Siguatera*, or *Fish-poison Disease*.—There are six varieties of poisonous fishes already known and described—viz.: the perches, the gurnards, the flounders, the spares, the gohies, the sardines, and the globe fishes, the last including two forms—the *Diodon* and the *Tetrodon*.

Confining our attention exclusively to these poisonous fishes, we find that they are most common in the following localities—at all events, that they have been discovered in these localities more frequently than elsewhere: in the Caribbean Sea, off Brazil, New Caledonia, the Seychelles, the Chinese Sea, the Malabar coast and other parts of India.

It should be remarked, that in these poisonous fishes the digestive organs, the spawn, and the liver, are invariably most dangerous; and that there are many fishes that may be eaten with the greatest safety when those parts are avoided. Another fact worthy of notice is the age of the fishes: some are dangerous when they have arrived at maturity. The *Lethrinus mambo*, for example, can be safely eaten when very young, but afterwards is exceedingly dangerous. Some naturalists attribute the poisonous qualities to the food found in the seas frequented by certain classes of these fishes. This is true under some circumstances, as in the case of the *Meletta venenosa*, which at certain seasons of the year feeds upon a green monad which covers the sea in large quantities. Wherever this green monad is seen the *Meletta* is poisonous, but wherever it has

not appeared the same fishes are eaten with the greatest safety. MM. Fonsagrives and Méricourt, agree with M. de Rochas in his opinion respecting the spawn, and with him consider it as the most poisonous part. If such be the case, it could soon be determined by ascertaining whether the injurious properties of the fishes are permanent, whether in the same species adults only are poisonous in their effects, and whether there is poison in those fishes only which contain spawn. To decide these questions, comparative experiments might be made with the male and female fishes of the same species inhabiting the same streams or waters. If it were found that the latter only were injurious, the difficulty would be satisfactorily solved.

The Spanish colonists gave the name of *Siguatera* to that union of symptoms which results from the eating of poisonous fishes indigenous to hot countries. The symptoms which arise are of two kinds. Severe attacks of indigestion or gastro-enteritic poisoning; or an icy coldness and depression, accompanied with great nervous disturbance. The symptoms are the same, whether severe enough to cause death, or only to excite inconvenience or temporary derangement; they differ only, i. e., in intensity. Gastro-enteritic *Siguatera* has all the appearance of a severe attack of indigestion—viz., nausea, vomiting—first of the food, then of mucus—coldness, depression of the pulse, cramp, and diarrhoea. The nervous type of symptoms—viz., convulsion and paralysis, which characterize the process of poisoning by fishes, are not to be found in any case of metallic poisoning. They seem to arise from a combination of accidents, as if they had been produced by different vegetable poisons of narcotic and acrid character. When the *Siguatera* assumes a gastro-enteritic form, the sufferer is, in general, quickly restored to health; while the nervous symptoms leave behind them the most serious traces of debility and irregularity. These have been known to continue for eight or nine days.

As illustrating the way in which the members of crews of vessels are poisoned by the eating of poisonous fishes, the following facts from the "Linnæan Transactions" for November, 1860, are valuable. The history of the circumstance was communicated by Mr. H. Jameson, of her Majesty's ship *Winchester*, to Sir William Burnett. The accident occurred on board the Dutch ship *Postilion*, lying in Simon's Bay, Cape of Good Hope. The *Winchester* being near Mr. Jameson was called to render his services to the sufferers. On arrival he found that the boatswain's mate and purser's steward had been suddenly taken ill after eating a part of a well-known deleterious fish, common in Simon's Bay, and called the toad or bladder-fish—the *Diodon*. They had been warned that the fish was poisonous, but were resolved to try the experiment, the boatswain declaring that the liver was not poisonous, but a great delicacy. They had partaken of dinner at twelve o'clock; immediately afterwards they partook of the fish, and scarcely ten minutes had elapsed when the boatswain became so ill that he was unable to raise himself without the greatest difficulty; his face was somewhat flushed; his eyes glistened, the pupils were rather contracted; his mouth was open; the lips were tumid and somewhat blue; the forehead covered with perspiration; the pulse weak, quick, and intermittent. The patient was extremely uneasy and in great distress, but still conscious; he complained of pain from constriction of the throat, and appeared inclined to vomit. It was with difficulty he could swallow a powder with some warm water. His state quickly assumed a paralytic form; his eyes became fixed in one direction; his breathing was difficult, and accompanied with dilatation of the nostrils; his face was pale, and covered with cold perspiration, his lips livid; his consciousness and pulse failed, and in scarcely seventeen minutes after partaking of the fish he was dead. The symptom exhibited by the purser's steward were of a similar kind. He also died within twenty minutes of the time after he had partaken of the fish.

The quantity consumed between the two men was only the liver of one fish; the liver might have weighed about four drachms. The entire fish measured only from six to eight inches in length.

Other examples similar to the above have been recorded by Præger; in all death was rapid, but we cannot stop to chronicle these, as the effects were the same as in the instances above cited.

It is worthy of note that some of the poisonous fishes are as hurtful to inferior animals as to man. Several illustrations of this fact have been collected. Dr. Collas, chief of the marine department of health at Pondicherry, had occasion to inquire into the poisonous nature of the goby, as he had been informed by the director of police there that several accidents had occurred in a native Mussulman's family of three persons, who had partaken of a dish made of some small fishes called in Talmic *Calou-oulouwe*. The head of the family also told Dr. Collas that three fowls had died soon after eating some of the same dish. A native doctor or "*mestris*" repeated this experiment of feeding fowls on the fish, and with the same result.

At eight o'clock in the morning, Dr. Collas gave to one chicken three heads, and to another four heads of these fishes; at half-past nine the symptoms began, at eleven o'clock they increased, between one and two the poisoned animals died, without convulsions, in a state of extreme prostration. In a second experiment, the bodies of these same fishes were used which the heads had been taken off. The animals suffered from the same symptoms, but less severely, and were quite well the next morning.

The livers of ten gobies were administered to one chicken, and killed it in two hours. The intestines of ten of these fishes, separated from the livers, produced the same results. The entire fishes, deprived of their livers and intestines, caused death in four hours and a half, in other experiments.—*Social Science Review*, July 19th, 1892.

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51. *Antidotes for Strychnia*.—Professor RANIERI BELLINI, after conducting a long series of experiments on poisoning by strychnia and its salts, arrives at the opinion, that the best antidotes are tannic acid and tannin, chlorine, and the tinctures of iodine and bromine. Chlorine, he maintains, attacks the strychnia even when it is diffused through the system; for he found that in rabbits poisoned with the sulphate of the alkaloid, on being made to inhale chlorine gas in quantity such as was not sufficient in itself to kill, the convulsions were retarded, and were milder when they occurred; death also was less rapid. The author further observed, that when strychnia was exhibited with pyrogallie acid, the convulsion was retarded for the space of half an hour, in comparison with other experiments in which the alkaloid was given by itself. Professor Bellini believes that this arrest in symptoms is not dependent on the acid acting chemically on the strychnia, but only through the astringent effects produced by the acid on the mucous membrane of the stomach, whereby the absorption of the poison is rendered difficult. The same author, dwelling on the frog-test for strychnia, asserts that this test is not to be trusted, inasmuch as other poisons produce the tetanic symptoms, although in a lesser degree. He adds, in speaking of the effects of the antidotes to which reference has been made, that he trusts his results will have a bearing not only on the treatment of strychnine tetanus, but on traumatic and idiopathic tetanic disease.—*London Medical Review*, June, 1863, from *Annali di Chimica*.